

CLAIMS

1. Method to fasten an outer shell (4) in a gyratory crusher (1), which comprises the outer shell (4), which is to be fastened in a frame (2) included in the crusher (1), and an inner shell (12), which is intended to be fastened on a crushing head (10) and to define, together with the outer shell (4), a crushing gap (14) for receipt of material to be crushed, c h a r a c t e r i z e d in that in a first step a first abutment surface (34) on the outer periphery of the outer shell (4) is brought to abutment against a first contact surface (32) on the frame (2), and in that in a second step a spacer member (28) for clamping of the outer shell (4) is pressed in between a second abutment surface (50) on the outer periphery of the outer shell (4) and the frame (2).

2. Method according to claim 1, wherein said first abutment surface (34) is situated at the lower end (33) of the outer shell (4) seen in a material flow direction (M), said second abutment surface (50) being situated closer to the upper end (51) of the outer shell (4) seen in the material flow direction (M).

3. Method according to claim 2, wherein in the second step the spacer member (28) is pressed in between the second abutment surface (50) and the frame (2) in the direction towards the first abutment surface (34).

4. Method according to any one of the preceding claims, wherein in the first step the outer shell (4) is secured after the first abutment surface (34) thereof has been brought to abutment against the first contact surface (32) of the frame (2), in the second step the spacer member (28) being secured after it having been pressed in between the second abutment surface (50) of the outer shell (4) and the frame (2).

5. Method according to any one of the preceding claims, wherein the spacer member (28) has a first sliding surface (52) and a second sliding surface (54) opposite the first sliding surface (52), the first sliding surface (52) sliding against the second abutment surface (50) of the outer shell (4) and the second sliding surface (54) sliding against a second contact surface (56) on the frame (2) when the spacer member (28) is pressed in.

6. Outer shell for fixing in a gyratory crusher (1), which comprises a frame (2), wherein the outer shell (4) should be fastened, and an inner shell (12), which is securable on a crushing head (10) in order to, together with the outer shell (4), define a crushing gap (14) for receipt of material to be crushed, c h a r a c t e r i z e d in that the outer shell (4) has a first abutment surface (34), which is arranged to, in a first fixing step, be brought to abutment against a first contact surface (32) on the frame (2), and a second abutment surface (50) that is arranged to, in a second

fixing step, be brought in engagement with a spacer member (28) that is possible to press between the frame (2) and the second abutment surface (50).

7. Outer shell according to claim 6, wherein said first abutment surface (34) is situated at the lower end (33) of the outer shell seen in a material flow direction (M), said second abutment surface (50) being situated closer to the upper end (51) of the outer shell (4) seen in the material flow direction (M).

8. Outer shell according to claim 6 or 7, wherein the second abutment surface (50) forms an angle to the vertical plane of 0–20 degrees and is arranged to slide against a first sliding surface (52) on the spacer member (28).

9. Outer shell according to any one of claims 6–8, wherein the second abutment surface (50) is substantially perpendicular to the main direction of the crushing forces (C2) that during operation arise in plane with the second abutment surface (50).

10. Outer shell according to any one of claims 6–9, wherein the first abutment surface (34) forms an angle to the vertical plane of 10–55 degrees, preferably such an angle that the first abutment surface (34) forms a substantially right angle to the main direction of the crushing forces (C1) that during operation arise in plane with the first abutment surface (34).

11. Outer shell according to any one of claims 6–10, wherein the second abutment surface (50) is situated substantially on a level with the portions (5) of the periphery of the outer shell (4) that surround the second abutment surface (50).

12. Gyratory crusher, which has an outer shell (4), which is securable in a frame (2) included in the crusher (1), and an inner shell (12), which is securable on a crushing head (10) in order to, together with the outer shell (4), define a crushing gap (14) for receipt of material to be crushed, characterized in that the outer shell (4) of the crusher has a first abutment surface (34), which is arranged to, in a first fixing step, be brought to abutment against a first contact surface (32) on the frame (2), and a second abutment surface (50) that is arranged to, in a second fixing step, be brought in engagement with a spacer member (28) that is possible to press in between the frame (2) and the second abutment surface (50).

13. Gyratory crusher according to claim 12, wherein said first abutment surface (34) is situated at the lower end (33) of the outer shell seen in a material flow direction (M), said second abutment surface (50) being situated closer to the upper end (51) of the outer shell (4) seen in the material flow direction (M).

14. Gyratory crusher according to any one of claims 12 and 13, wherein the spacer member is an intermediate ring (28), which has a substantially tubular part (43), which is intended to be pressed in between the second abutment surface (50) of the outer shell (4) and a second contact surface (56) on the frame (2).

15. Gyratory crusher according to any one of claims 12–14, wherein the spacer member (42) is divided into two to eight segments (68, 70, 72, 74).

5 16. Gyratory crusher according to any one of claims 12–15, wherein the spacer member (28) has a first sliding surface (52), which forms an angle to the vertical plane of 0–20 degrees and which is arranged to slide against the second abutment surface (50) on the outer shell (4) upon the pressing-in of the spacer member (28).

10 17. Gyratory crusher according to any one of claims 12–16, wherein the spacer member (28) has a second sliding surface (54), which is arranged to slide against a second contact surface (56) on the frame (2), which second contact surface (56) is terminated by a shoulder (62) protruding from the frame (2), the lower limitation, in the material flow direction (M), of the shoulder (62) being situated substantially at the lower limitation (64), seen in the material flow direction (M), of the sliding surface (54).

15 18. Gyratory crusher according to claim 17, wherein the second contact surface (56) of the frame (2) forms an angle to the vertical plane of 0–10 degrees.

19. Gyratory crusher according to any one of claims 12–18, wherein the upper portion (146), in the material flow direction (M), of the spacer member (128) is protected by a replaceable protecting plate (147).

20 20. Gyratory crusher according to any one of claims 12–19, wherein the spacer member (28) has a mounting flange (44), which by means of mounting members (58) is arranged to press the spacer member (28) in between the second abutment surface (50) of the outer shell (4) and the frame (2) and to secure the spacer member (28) against the frame (2).

25 21. Spacer member for use upon fixing of an outer shell (4) in a frame (2) included in a gyratory crusher (1), which outer shell (4) is intended to, together with an inner shell (12), which is securable on a crushing head (10), define a crushing gap (14) for receipt of material to be crushed in the crusher (1), the outer shell (4) having a first abutment surface (34), which in a first fixing step has been brought to
30 abutment against a first contact surface (32) on the frame (2), and the spacer member (28) being arranged to, in a second fixing step, be pressed in between a second abutment surface (50) on the outer shell (4) and the frame (2).